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Labour force survey sample design

Changes to the labour force survey sample, design and frame, in particular: adopting the ABS address register; and state sampling fraction changes

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Introduction

The sample frame for the Labour Force Survey (LFS) is refreshed at regular intervals to ensure it accurately reflects the location of Australian residences as the population grows (see [Information Paper: Labour Force Survey Sample Design, May 2013](#) (<https://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/98A42DFA1602ED2CCA2582D700170FB2?opendocument>)). There are two key changes which have been applied in 2018: the adoption of the address register, and changes to state sampling fractions.

From July 2018 data collected for the LFS will phase in the use of the Address Register as the sampling frame for unit selection, and apply updated state sampling fractions for selection probabilities within each state. This paper outlines the key changes to sample selection resulting from these changes, and provides a summary of all sample design changes that have been made since the LFS was first run in 1960.

No changes have been made to relative standard error targets for each state and territory as part of this update. For information on the latest targets, and a comparison to previous targets, please see [Information Paper: Labour Force Survey Sample Design, May 2013](#) (<https://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures>

Address register

Usage of the ABS address register

The area-based sample selection that had been used previously by the LFS relied upon the identification of units through a multi-stage selection process. This process divides the strata (the states and territories by area type) into separate first-stage units (FSU's). These FSU's were then divided into separate base frame units (BFU's) comprising separate mesh blocks which contain an average of 30 - 60 dwellings. To identify the sample for inclusion in the survey, field officers would make an initial visit to the BFU's to compile a list of all dwellings (addresses). This list was then used to form clusters of dwellings within the BFU – these being the eventual dwellings selected in the sample.

In response to the need for more efficient and effective household survey designs, the Address Register was established by the ABS in 2015 as a comprehensive list of all physical addresses in Australia. The Address Register Common Frame is a trusted and comprehensive data set of Australian address information. It contains current address text details, coordinate reference (or “geocode”), and address use information for addresses in Australia.

Usage of the Address Register as the LFS sampling frame forms a three stage selection process where field officers do not have to visit base frame units to compile dwelling lists – enhancing the efficiency of data collection and effectiveness of sample selected for the LFS. This process of sample selection is illustrated below in Figure 1.

Figure 1 - Three stages of selection

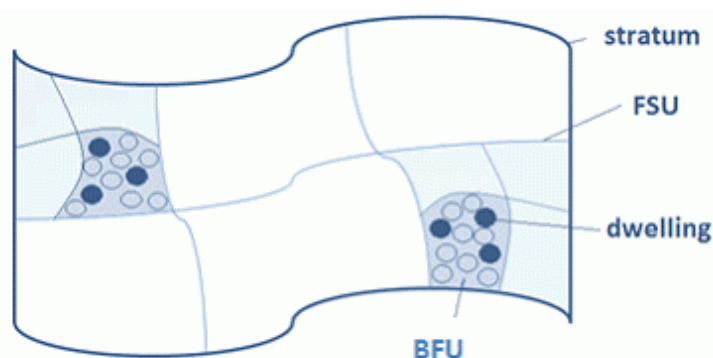


Figure 1 shows the first stage of selection is the FSU within a stratum, the second is a Base Frame unit within an FSU, then third is the dwellings within a BFU.

In practical terms, the adoption of the address register means:

- The ABS is now able to co-locate samples in the same geographic area to a greater extent than previously, leading to greater efficiencies in the field.
- Growth strata are now able to be identified based on information from state and territory governments as well as building approvals data, which differs slightly to the old method, where growth areas were identified ahead of dwellings being constructed and occupied. While the approach to identifying a growth area is slightly different, the Address Register samples will continue to ensure a representative sample of households within growth areas.
- Previously, growth in the general population was realised as growth in the average cluster size over the 5 year design period. However, using the Address Register, sampling cluster sizes will be maintained with a greater number of clusters selected over time in order to represent population growth. This improves the efficiency of the selected samples.

None of the above mentioned changes will impact on the representativeness of the sample selected for the LFS.

Phase in of the address register

In July 2018, the incoming rotation group was selected directly from the Address Register. This means one of the eight rotation groups in July 2018 was selected from the Address Register. As per the standard LFS approach, this group will remain in the survey for eight months. In August 2018, the next incoming rotation group being cycled into the survey has also been selected from the Address Register, resulting in two of the eight rotation groups in the survey being selected from the Address Register. This iterative process of selecting the next incoming rotation group from the Address Register will continue through to February 2019 when all eight groups in the survey will have been selected from the Address Register.

For further information regarding the Address Register, please see the [Labour Statistics Concepts, Sources and Methods \(https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/6102.0.55.001~Feb%202018~Main%20Features~Methods%20Used%20in%20ABS%20Household%20Surveys~17\)](https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/6102.0.55.001~Feb%202018~Main%20Features~Methods%20Used%20in%20ABS%20Household%20Surveys~17).

State sampling fraction changes

The process of identifying a sample unit for the LFS involves the application of state sampling fractions (otherwise known as state skips). This methodology is not new, however the fractions have been updated to reflect changes in populations over time.

The state sampling fraction method applies a predefined skip interval for each state which defines the probability of an address within each respective state being selected for the survey. A sampling fraction is applied to each state and territory (see Table 1 below for

sampling fractions in 2013 and 2018). For example, the skip interval in New South Wales from 2018 is 445, which means that each unit in New South Wales has a probability of 1 in 445 (or 0.0022) of being selected from the address register for the survey (the sampling fraction).

The state skip interval also provides the initial weight that is applied to the sample before any adjustments are made for under or overcoverage. (See [Information Paper: Forthcoming Changes to Labour Force Statistics \(https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/6292.0\)](https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/6292.0) for further information on weighting procedures). By applying the state skip as an initial weight in New South Wales, for example, the interval of 445 indicates that prior to any weighting adjustments being applied each survey respondent in New South Wales would be weighted to 445 persons.

The changes in skip intervals from 2013 to 2018 reflect changes in the populations and response rates in each state and territory. The changes allow the 2018 sample sizes required for each state and territory, as shown in Table 1, to be achieved.

Table 1 – State skip intervals

STATE	2013 design state sampling fraction	2018 design state sampling fraction	2018 target sample size (fully responding dwellings)
New South Wales	1 in 419	1 in 445	6,029
Victoria	1 in 390	1 in 438	5,169
Queensland	1 in 369	1 in 416	4,306
South Australia	1 in 209	1 in 218	3,048
Western Australia	1 in 295	1 in 310	2,833
Tasmania	1 in 99	1 in 99	2,088
Northern Territory	1 in 52	1 in 52	1,323
Australian Capital Territory	1 in 149	1 in 169	865
Total	1 in 312	1 in 339	25,660

History of sample designs

The sampling methodology of the LFS has remained substantially the same since the first survey was run in 1960. The main changes in sample design and estimation procedures prior to the 2018 changes are summarised below.

2011 sample design:

- the use of a new Australian Statistical Geography Standard (ASGS) for sample selection and output;
- the roll-out of the new sample occurred over a four month period; and
- the decoupling (separation) of the samples for the Monthly Population Survey (including the LFS) and Special Social Surveys

2008 sample modification and restoration:

- as one of a range of ABS savings initiatives in 2008-09, there was a 24% reduction in the LFS sample size phased in from July 2008. The sample was subsequently restored to its previous size over a four month phase-in period between September and December 2009.

2006 sample design:

- the Northern Territory and Australian Capital Territory have previously been excluded from the state allocation calculation, because to include them would have resulted in a sample size which was considered too large at the time to manage operationally. The 2006 sample redesign includes the territories in the allocation formula, resulting in an increase in sample allocation for the Northern Territory and a decrease in sample allocation for the states and the Australian Capital Territory;
- better identification of expected growth areas in states and territories, resulting in an improved private dwelling sample over time;
- significant changes made to regional boundaries in Queensland and minor changes to those in New South Wales; and
- the introduction of composite estimation with the resulting efficiency gain leading to a reduction in the sample size of about 6,800 persons (11%) compared with the initial 2001 sample design.

2001 sample design:

- the introduction of a sample frame for discrete Aboriginal and Torres Strait Islander communities to aid enumeration;
- a move to Australian Standard Geographical Classification (ASGC) Remoteness structure rather than population density for sample selection in less populated areas;
- a change in non-private dwelling enumeration from all hotel and motel units to only those occupied by usual residents;
- a small gain in sample efficiency arising from the use of improved information in the technical stages of sample design and of sample selection; and
- a reduction in the sample size of about 1,500 persons (3%) compared with the initial 1996 sample design.

1996 sample design:

- improved design efficiency arising from the introduction of telephone interviewing (which enabled selection of a less-clustered design); and
- an overall reduction in the sample size of about 1,500 persons (2%) compared with the start of the 1991 sample design.

1986 sample design:

- a reduction in the overall sampling fraction of approximately 13%, resulting in a total initial sample size about 3,000 persons (4%) less than that at the start of the 1981 redesign sample; and
- changes to certain regional boundaries in New South Wales, Victoria and Queensland.

1981 sample design:

- a change in estimation procedure from state/territory of enumeration to state/territory of usual residence;
- transfer of caravan parks from the private dwelling sample to the non-private dwelling sample; and
- reduction of sample fraction in Western Australia from 1 in 90 to 1 in 100, due to population growth.

1976 sample design:

- the introduction of regional stratification;
- the introduction of a one-eighth rotation scheme in the non-private dwelling sample; and
- an increase in the Australian Capital Territory sampling fraction from 1 in 200 to 1 in 100.

1971 sample design:

- the introduction of different sampling fractions across states and territories; and
- a reduction in sample size through reducing the overall sampling fraction from 1 in 100 to about 1 in 150.

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